

Dr. Hou-Tong Chen
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Education

- PhD 2004 Physics Rensselaer Polytechnic Institute
- M.S. 2000 Physics University of Science & Technology of China
- B.S. 1997 Physics University of Science & Technology of China

Appointments

- 06/2010 – CINT Scientist Los Alamos National Laboratory
- 06/2008 – Technical Staff Member Los Alamos National Laboratory
- 05/2005 – 05/2008 Postdoc Research Associate Los Alamos National Laboratory
- 04/2005 – 05/2005 Postdoc Fellow Rensselaer Polytechnic Institute

Research Interests

- Metamaterials and applications
- Surface plasmonics
- Ultrafast optics and terahertz time-domain spectroscopy

Research Highlights

- For the first time successfully developed an apertureless scanning near-field terahertz microscope capable of nanometers resolution
- Identified a novel near-field imaging mechanism
- Demonstrated the first active terahertz metamaterial
- Demonstrated the first frequency agile terahertz metamaterial
- Accomplished ultrafast switching of terahertz radiation using dynamic metamaterials
- Demonstrated an efficient metamaterial-based electrically driven terahertz phase modulator
- Achieved broadband modulation of impulsive terahertz radiation using a metamaterial device
- Demonstrated a novel approach of THz antireflection coating using metamaterials, and identified its mechanism

Awards and Scholarships

- 2007 LAAP Achievement Award, LANL
- 2007 Postdoctoral Publication Prize Honorable Mention, LANL
- 1999 Guanghua Scholarship, University of Science & Technology of China
- 1995 Excellent Student Scholarship, University of Science & Technology of China

Selected Publications

1. **H.-T. Chen**, J. Zhou, J. F. O'Hara, F. Chen, A. K. Azad, and A. J. Taylor, "Antireflection coating using metamaterials and identification of its mechanism," *Physical Review Letters*, in press (2010).
2. **H.-T. Chen**, W. J. Padilla, M. J. Cich, A. K. Azad, R. D. Averitt, and A. J. Taylor, "A

metamaterial solid-state terahertz phase modulator,” *Nature Photonics* **3**, 148–151 (2009).

3. **H.-T. Chen**, S. Palit, T. Tyler, C. M. Bingham, J. M. O. Zide, J. F. O’Hara, D. R. Smith, A. C. Gossard, R. D. Averitt, W. J. Padilla, N. M. Jokerst, and A. J. Taylor, “Hybrid metamaterials enable fast electrical modulation of freely propagating terahertz waves,” *Applied Physics Letters* **93**, 091117 (2008).
4. **H.-T. Chen**, H. Lu, A. K. Azad, R. D. Averitt, A. C. Gossard, S. A. Trugman, J. F. O’Hara, and A. J. Taylor, “Electronic control of extraordinary terahertz transmission through sub-wavelength metal hole arrays,” *Optics Express* **16**, 7641–7648 (2008).
5. **H.-T. Chen**, J. F. O’Hara, A. K. Azad, A. J. Taylor, R. D. Averitt, D. B. Shrekenhamer, and W. J. Padilla, “Experimental demonstration of frequency agile terahertz metamaterials,” *Nature Photonics* **2**, 295–298 (2008).
6. **H.-T. Chen**, W. J. Padilla, J. M. O. Zide, S. R. Bank, A. C. Gossard, A. J. Taylor, and R. D. Averitt, “Ultrafast optical switching of terahertz metamaterials fabricated on ErAs/GaAs nanoisland superlattices,” *Optics Letters* **32**, 1620–1622 (2007).
7. **H.-T. Chen**, J. F. O’Hara, A. J. Taylor, R. D. Averitt, C. Highstrete, M. Lee, and W. J. Padilla, “Complementary planar terahertz metamaterials,” *Optics Express* **15**, 1084–1095 (2007).
8. **H.-T. Chen**, W. J. Padilla, J. M. O. Zide, A. C. Gossard, A. J. Taylor, and R. D. Averitt, “Active terahertz metamaterial devices,” *Nature* **444**, 597–600 (2006).
9. **H.-T. Chen**, S. Kraatz, R. Kersting, and G. C. Cho, “Identification of a resonant imaging process in apertureless near-field microscopy,” *Physical Review Letters* **93**, 267401 (2004).
10. **H.-T. Chen**, G. C. Cho, and R. Kersting, “Terahertz imaging with nanometer resolution,” *Applied Physics Letters* **83**, 3009–3011 (2003).

Patent Pending

1. “Active terahertz metamaterial devices,” International Patent Pending PCT/US2007/082023.
2. “Dynamical frequency tuning of electric and magnetic metamaterial response,” U.S. Patent Pending 11/871,642.

Recent Invited Talks and Seminars

1. “Advances in Terahertz Metamaterials and Applications,”
Seminar @ the Electrical Engineering Department, UCLA, May 17, 2010.
2. “Actively Controllable Properties of Terahertz Metamaterials and Their Applications,”
Colloquium @ University of Science and Technology of China, Nov. 23, 2009
3. “Actively Controllable Properties of Terahertz Metamaterials and Their Applications,”
LCLS-PULSE seminars @ SLAC, Stanford University, Oct. 13, 2009
4. “Recent Progress in Terahertz Metamaterials and Devices,”
Shenzhen International Conference on Advanced Science and Technology (SICAST2009) – Terahertz Science and Technology, Shenzhen, China, 15–20 Nov. 2009.
5. “Active Terahertz Metamaterials,”
Frontiers in Optics 2009, San Jose, CA, 11–15 Oct. 2009

6. “Terahertz metamaterials and devices,”
Topical Problems of Biophotonics – 2009, Nizhny Novgorod, Russia, 19–24 Jul. 2009.
7. “Active Terahertz Metamaterials and Devices,”
2009 SURA Terahertz Applications Symposium, Washington, DC, 10–12 Jun. 2009.
8. “Active metamaterials and devices for terahertz applications,”
International Workshop on Electromagnetic Metamaterials III: Toward Real World Applications, Los Alamos, NM, 18–19 May 2009.

Professional Activities

- Organizing Committee: International Workshop on Electromagnetic Metamaterials IV, Albuquerque, NM, August 2010.
- Co-chair in the Early Career Session in the Internal Workshop on Electromagnetic Metamaterials III, Los Alamos, NM, May 2009.
- Program Committee: 2009 International Conference on Optical Instrument and Technology (OIT09): Session 7 Opto-electronic information security
- International Advisory Committee: IRMMW-THz-2009
- Member of the Editorial Committee: *International Journal of Terahertz Science and Technology*
- Regular reviewer for > 10 journals, including Nature Photonics and Physical Review Letters